Check List the journal of biodiversity data

NOTES ON GEOGRAPHIC DISTRIBUTION

Check List 18 (6): 1333–1336
https://doi.org/10.15560/18.6.1333

PENSOFT

New records and notes on the geographical distribution of the colonial cup coral *Coenocyathus bowersi* Vaughan, 1906 (Cnidaria, Scleractinia) from northern Chile

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Abstract. We present two new records of the colonial cup coral *Coenocyathus bowersi* Vaughan, 1906 from northern Chile. Colonies were collected off the coastal of Taltal, Antofagasta Region, and off the coast of the city of Iquique, Tarapacá Region, both in northern Chile. Our finds confirm the presence of this species on the Chilean coast and extend the geographic range of this species approximately 765 km north from the only other known occurrences of *C. bowersi* in Chile.

Keywords. Antofagasta, Chilean coast, Hexacorallia, Taltal, Iquique, Pacific Coast

Academic editor: Sergio N. Stampar
Received 3 May 2022, accepted 6 December 2022, published 17 December 2022

Méndez-Abarca F, Pepe-Victoriano R, Mundaca EA (2022) New records and notes on the geographical distribution of the colonial cup coral *Coenocyathus bowersi* Vaughan, 1906 (Cnidaria, Scleractinia) from northern Chile. Check List 18 (6): 1333–1336. https://doi.org/10.15560/18.6.1333

Introduction

In Chilean marine waters there are currently 57 species of scleractinian corals, distributed in 20 families (Addamo et al. 2022). Among these families, the Caryophylliidae comprises nine genera and 17 species occurring in the Chilean continental and insular coastal waters (Addamo et al. 2022).

The genus *Coenocyathus* Milne Edwards & Haime, 1848, which belongs to the family Caryophylliidae, includes colonial coral species that inhabit tropical and subtropical waters around the world, but with only one species lives in Chilean marine waters: *Coenocyathus bowersi* Vaughan, 1906 (Araya et al. 2016). This species occurs from Monterey, California, USA, and the Gulf of California (Reyes-Bonilla and Cruz-Piñón 2000) to southern Panama (Cairns 1994), and its known to occur only in a single place in the Southern Hemisphere, off the coast of the city of Caldera, northern Chile (Araya et al. 2016).

To advance the knowledge of this species in Chilean waters, we report here our finding of two colonies in coastal waters of northern Chile. These are new localities for the species in Chile.

Methods

The two specimens were collected by autonomous diving. The material was collected at depths of 36–41 m depth, during two separate diving sessions, off the coast of the city of Iquique and the town of Taltal, Chile. The specimens were detached from the rocky substrate using a knife. The specimens were immersed in 95% ethyl alcohol for 10 days to induce dehydration, removed, then were stored in closed plastic containers. The samples were washed and stripped of all organic matter to expose the calcareous skeleton for morphological comparison. The specimens were measured, photographed with a Canon PowerShot SX60 HS camera, and deposited in the marine invertebrate collection of the "Vida

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Salvaje–Museo Vivo", owned by the Animal Kingdom Foundation (FRA), Arica, Chile.

Results

Phylum Cnidaria Hatschek, 1888
Class Anthozoa Ehrenberg, 1834
Subclass Hexacorallia Haeckel, 1866
Order Scleractinia Bourne, 1900
Family Caryophylliidae Dana, 1846
Genus *Coenocyathus* Milne Edwards & Haime, 1848

***Coenocyathus bowersi* Vaughan, 1906**

Figures 1, 3

New records. CHILE – Antofagasta Region • Taltal, Pelao Sáez sector; 25°38′42″S, 070°38′35″W; 42 m depth; 12.VII.2013; F. Méndez-Abarca leg; collected manually from rocky substrate; 1 specimen (Vida Salvaje - Museo Vivo, COLECNI0149FRA) – Tarapacá Region • 12 km south of Iquique; 20°12′51″S, 70°09′09″W; 32 m depth; 26.II.2014; F. Méndez-Abarca leg.; collected manually from sandstone substrate; 1 specimen (Vida Salvaje - Museo Vivo COLECNI0150FRA).

Figure 1. Distribution of *Coenocyathus bowersi* along the Pacific coast of America showing previously known and new records reported here. **A.** Distribution in the Northern Hemisphere based on Cairns (1994). **B.** Chilean occurrences of the species: green icons = Caldera (reported by Araya et al. 2016); red icons = new records at Iquique and Taltal (present study).

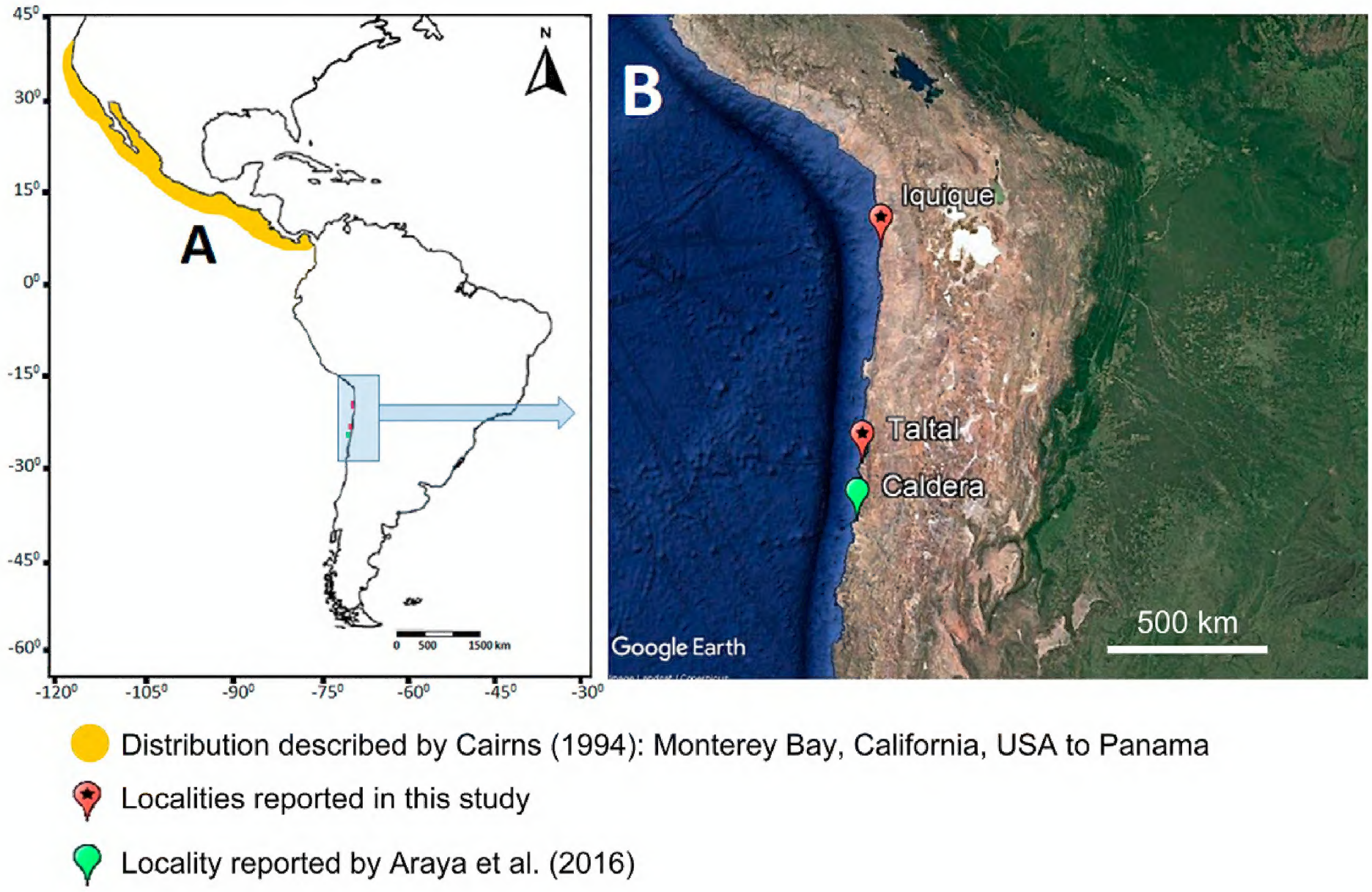

Figure 2. *Coenocyathus bowersi*. **A, B.** Colony collected in Taltal, Chile. Scale bar = 2.5 cm. **C, D.** Colony collected at Iquique, Chile; details of the coral skeleton showing septal insertion of the polyps (corallites). Scale bar = 1 cm.

Identification. Our identification of the specimens was based on the meristic and morphometric characters described by Bythell (1986) and Araya et al. (2016). Both colonies of *C. bowersi* have cylindrical corallites with phacelloid to dentroid coralla forming bushy colonies. The calyxes are circular or oval, with 6–14 primary septa present in each calyx, which is typical of *C. bowersi* specimens (Araya et al. 2016). The corallum is ivory-white, with darker yellowish-brown areas resulting from the remains of organic matter. The specimen collected in Iquique has corallites 3–8 mm in diameter, in average, smaller than corallites observed in the colony from Taltal, with corallites 4–15 mm. Despite the size variation, the diameter of the corallites in both colonies was consistent with those described by Araya et al. (2016) which ranged from 2 to 12 mm. Our two specimens had calyxes divided with 5–12 primary septa, which is similar to the 6–14 septa described by Araya et al. (2016). The septa are irregularly arranged, which could be attributed to the differences in ontogeny. The calyxes have a well-defined to irregular crown of pali, like those described by Araya et al. (2016). The colony size of the specimen collected at Iquique is 42 mm long, smaller than the two colonies collected by Araya et al. (2016) in Caldera, which measured 100 mm and 280 mm long. The colony from Taltal measures 177 mm, within the size range described by Araya et al. (2016).

Discussion

The distribution of *Coenocyathus bowersi*, as described by Cairns (1994), extends from Monterey Bay, California, USA, to southern Panama in the Northern Hemisphere. This distribution was extended by Araya et al. (2016), who recorded two colonies at one site at the port of Caldera (27°04′00″S, 070°49′00″W), Atacama Region, Chile. This locality is the southernmost record for *C. bowersi* (Fig. 1) and the first record from South America.

Our specimens of *C. bowersi* collected at Taltal and Iquique (Fig. 2) confirm the continued presence of this species on the Chilean coast and expands the Chilean range north from Caldera by approximately 765 km (towards the main geographic range of the species). As the morphology of our Chilean colonies do not differ from those described by Cairns (1994, 2000) and Cairns and Kitahara (2012) from the Northern Hemisphere, we suggest a broader distribution along the west coast and that this species may have been previously overlooked due to insufficient sampling effort.

Acknowledgements

We thank the Programa de Magíster en Acuicultura, Mención Recursos Hidrobiológicos y Mención Acuiponía, Universidad Arturo Prat, Chile. We also thank Lorena Avilés-Arredondo for reviewing the structure of the manuscript and Dr. Mariana Lazzaro-Salazar for

proofreading the manuscript. Finally, we would like to thank the reviewers and academic editor for their positive contribution that helped to improve the quality of the manuscript.

Authors' Contributions

Conceptualization: FMA Investigation: FMA. Resources: FMA. Visualization: FMA, EAM, RPV Writing – Original Draft: FMA, EAM, RPV. Writing – Review & Editing: RPV.

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